

Terry Tamminen  
Agency Secretary  
Cal/EPA



## Department of Toxic Substances Control

5796 Corporate Avenue  
Cypress, California 90630



Arnold Schwarzenegger  
Governor

September 8, 2004

Ms. Justine Dishart  
Commander NTC & Fort Irwin  
Directorate of Public Works  
P.O. Box 105097  
Attn: AFZJ-PW-EV  
Fort Irwin, California 92310-5097

*C. PLOTKIN*

COMMENTS TO THE DRAFT REMEDIAL INVESTIGATION REPORT FTIR-27, FORT  
IRWIN NATIONAL ARMY TRAINING CENTER, SAN BERNARDINO COUNTY,  
CALIFORNIA

Dear Ms. Dishart:

The Department of Toxic Substances Control (DTSC) has reviewed the above referenced report prepared by Tetra Tech EM, Inc., received by this office on July 20, 2004. DTSC has prepared comments to the Draft Remedial Investigation found in Enclosures A and B.

DTSC acknowledges the low probability of residual TPH contamination impacting the groundwater at FTIR-27 and concurs with the not further action recommendation presented.

If you have any questions or would like to arrange a meeting to further discuss FTIR-27, please feel free to contact me by phone at (714) 484-5448 or by e-mail at [cplotkin@dtsc.ca.gov](mailto:cplotkin@dtsc.ca.gov).

Sincerely,

Curtis P. Plotkin  
Remedial Project Manager  
Office of Military Facilities, Unit 'B'

Enclosures

cc: See next page.

### **General Comments**

1. The report was not analyzed for syntactical or grammatical errors, unless the validity of the statement is in question or the statement was confusing.
2. In general, the report was well organized and written.

### **Specific Comments**

1. On July 8, 2003, DTSC cautioned the use of Seasonal Soil Compartment Model (SESOL) in evaluation of the contaminant transport at site FTIR-27. DTSC suggested that other more appropriate models, commercially available, be employed for the evaluation of the site. However, Fort Irwin and the United States Corps of Engineers proceeded in the use of SESOL to characterize the vertical transport of contaminants at the site. DTSC has the following comments:
  - a. The strength of SESOL is in its simplicity and ability to predict groundwater recharge from measured monthly or daily climatic data. The strength of SESOL's simplicity is tempered by the following:
    - i. Fort Irwin (FTIR-27) is located in an arid desert, topographically closed groundwater basin.
    - ii. Annual precipitation rates as low as 4 inches per year
    - iii. Daytime temperatures ranging from 100°F to 110°F, with occasional highs exceeding 125°F.
    - iv. Vadose zone matric potentials in the high negative numbers
    - v. Recharge from the surface, via precipitation, is scant and likely to occur at the outer edges of the basin where the alluvium is thin and aquifer closer to the surface.
    - vi. SESOL is a rudimentary 1D empirical unsaturated soil model.
    - vii. Requires extensive climatic and chemical data.
    - viii. Unable to generate credible results using 'raw' monthly climatic data in an arid desert environment.
2. DTSC provided the suggestion that Fort Irwin evaluate the use of HYDRUS 2D, VS2DT or other similar two dimensional model. Both these models provide for 1D and 2D analysis in a complex vadose zone. The aforementioned models are extremely flexible, and do not specifically utilize precipitation as the force to facilitate migration of contaminants vertically in the subsurface, as does SESOL. HYDRUS 2D and VS2DT also incorporate convection-dispersion type equations for heat and solute transport (diffusion and gaseous phase migration).



Terry Tamminen  
Agency Secretary  
Cal/EPA

## Department of Toxic Substances Control


1011 North Grandview Avenue  
Glendale, California 91201

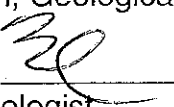


Arnold Schwarzenegger  
Governor

### MEMORANDUM

TO : Curtis Plotkin  
Project Manager  
Office of Military Facilities, Cypress

FROM : Richard L. Coffman, Ph.D., RG   
Senior Engineering Geologist  
Site Mitigation Program, Geological Services Unit, Glendale

CONCUR : Craig Christmann, RG   
Senior Engineering Geologist  
Site Mitigation Program, Geological Services Unit, Glendale

DATE : August 31, 2004

SUBJECT: Review of Draft Remedial Investigation Report at Fort Irwin  
Installation Restoration Site 27 (FTIR-27), National Training Center  
Fort Irwin, San Bernardino County, California

PCA 14740

Site Code 400063-47

Log No. 20043028

The Geological Services Unit (GSU) was requested to review and provide comments on the July 15, 2004 Draft Remedial Investigation Report at Fort Irwin Installation Restoration Site 27 (FTIR-27), National Training Center Fort Irwin, San Bernardino County, California. This remedial investigation (RI) report was prepared by Tetra Tech EM Inc. for the U.S. Army Corps of Engineers, Sacramento District. The site is currently a fenced vacant lot near the center of the Cantonment area at National Training Center (NTC) Fort Irwin, and was the former location of a 10,000-gallon, underground concrete vault (Tank 72) that reportedly contained Bunker C fuel oil. The vault was removed in January 1994, and in March 1994, 1,800 tons of petroleum hydrocarbon contaminated soil was excavated from beneath and around the former vault to an average depth of about 15 feet below ground surface (bgs).

Activities associated with this RI included the advancement of three borings ranging in depth from 35.5 feet bgs to 66.5 feet bgs. Each of those borings were within the footprint of the former vault. Soil samples collected from the borings indicated the presence of total petroleum hydrocarbons (TPH), predominantly in the diesel and motor oil range, along with minor concentrations of semi-volatile and volatile organic

Curtis Plotkin  
August 31, 2004  
Pg 3

In conclusion, although the GSU would have preferred that either VS2DT or Hydrus-2D be used to more accurately assess the potential threat to groundwater, the GSU does acknowledge that it is unlikely that the residual TPH contamination present in the vadose zone, as reported, will be transported the necessary vertical distance (between 100 and 300 feet bgs) to reach groundwater. This is primarily because the main force that drives contaminant migration at this site is precipitation and downward percolation, which is extremely low in the Fort Irwin area. However, the GSU notes that it is still unclear exactly how deep TPH-impacted soil actually extends beneath the former vault area, and that the presence of deeper TPH-impacted soil could modify the model output and reduce the time required for contamination to reach groundwater.

Any questions regarding the information provided in this memorandum, should be directed to Richard Coffman at (818) 551-2175 or via e-mail at [rcoffman@dtsc.ca.gov](mailto:rcoffman@dtsc.ca.gov).